

AMENDMENT TO THE CLAIMS

1-29 (Cancelled)

30.(new) A chemical mechanical planarization apparatus comprising:
a work piece carrier;

a flexible work piece diaphragm extending beneath at least a portion of the work piece carrier, the flexible work piece diaphragm having a first surface facing the work piece carrier, a second surface providing a work piece supporting surface, and an outer periphery;
and

an annular outer rib having a first end, a second end, and an extended portion, the first end connected to the flexible work piece diaphragm at the outer periphery, the extended portion connected to and extending from the second end and attached to the work piece carrier, the flexible work piece diaphragm positioned to define, with the annular outer rib, at least a first pressurizable region between the work piece carrier and the flexible work piece diaphragm and the extended portion forming a second pressurizable region between the extended portion and the work piece carrier.

31.(new) The apparatus of claim 30 further comprising at least one annular inner rib connected to the work piece diaphragm at a location interior to the periphery of the work piece diaphragm and attached to the work piece carrier, the at least one annular inner rib dividing the at least a first pressurizable region to define a first pressure zone between the work piece carrier and the flexible work piece diaphragm radially inward from the at least one annular inner rib and a second pressure zone between the work piece carrier and the flexible work piece diaphragm between the at least one annular inner rib and the annular outer rib.

32.(new) The apparatus of claim 30 further comprising at least one clamp configured to clamp the extended portion to the work piece carrier.

33.(new) The apparatus of claim 30 wherein the extended portion comprises at least a web portion and an enlarged sealing feature configured to be clamped against a mating recess in the work piece carrier.

34.(new) The apparatus of claim 30 wherein the extended portion comprises two web portions, each of the two web portions terminating in an enlarged sealing feature configured to be clamped against the work piece carrier.

35.(new) The apparatus of claim 30 wherein the flexible work piece diaphragm and the annular outer rib comprise an integrally formed single piece of elastic material.

36.(new) A chemical mechanical planarization apparatus comprising:
a work piece carrier;

a flexible work piece diaphragm having a substantially planar portion bounded by a periphery positioned in a plane beneath at least a portion of the work piece carrier; and at least one annular rib, the at least one annular rib comprising:
a first end connected to the work piece carrier;
a second end connected to the flexible work piece diaphragm; and
a mid portion between the first end and the second end, the mid portion having a width dimension substantially less than a width dimension of the second end.

37.(new) The apparatus of claim 36 wherein the at least one annular rib comprises an inner wall and an outer wall, each of the inner wall and the outer wall extending from the first end to the second end and wherein at least one portion of one of the inner wall and the outer wall is substantially perpendicular to the plane and a lower portion of one of the inner wall and the outer wall comprises a portion that is not perpendicular to the plane.

38.(new) The apparatus of claim 36 wherein the at least one annular rib comprises an outer rib connected to the flexible work piece diaphragm at the periphery, and wherein the apparatus further comprises an inner annular rib connected to the flexible work piece diaphragm and wherein the outer rib, inner annular rib, flexible work piece diaphragm, and work piece carrier are configured to bound a chamber in which pressure can be controlled.

39.(new) The apparatus of claim 36 wherein the at least one annular rib comprises an outer rib connected to the flexible work piece diaphragm at the periphery and wherein the first end comprises at least a web portion configured to be clamped to the work piece carrier.

40.(new) The apparatus of claim 39 wherein the first end comprises two web portions, each of the two web portions terminating in an enlarged sealing feature configured to be clamped against the work piece carrier.

41.(new) The apparatus of claim 40 wherein the two web portions are configured to form a pressurizable region between the first end and the work piece carrier.

42.(new) A chemical mechanical planarization apparatus comprising:
a work piece carrier;
a flexible work piece diaphragm having a substantially planar portion bounded by a periphery positioned in a plane beneath at least a portion of the work piece carrier; and
an annular outer rib comprising:
a first end connected to the work piece carrier;
a second end connected to the flexible work piece diaphragm at the periphery thereof; and
a mid portion between the first end and the second end, the mid portion including an angular flexure portion.

43.(new) The apparatus of claim 42 wherein one of the first end and the second end has a width greater than the other of the first end and the second end.

44.(new) The apparatus of claim 42 wherein the mid portion has a bellows shape.

45.(new) The apparatus of claim 42 wherein the flexible work piece diaphragm and the annular outer ring comprise an integrally formed single piece of elastic material.

46.(new) The apparatus of claim 42 wherein the first end comprises at least a web portion configured to be clamped to the work piece carrier.

47.(new) The apparatus of claim 46 wherein the first end comprises two web portions, each of the two web portions terminating in an enlarged sealing feature configured to be clamped against the work piece carrier.

48.(new) The apparatus of claim 47 wherein the two web portions are configured to form a pressurizable region between the first end and the work piece carrier.

49.(new) The apparatus of claim 42 further comprising an inner annular rib connected to the work piece carrier and to the flexible work piece at a position interior to the periphery and configured to form a pressurizable region with the work piece carrier, the flexible work piece diaphragm, and the work piece carrier.